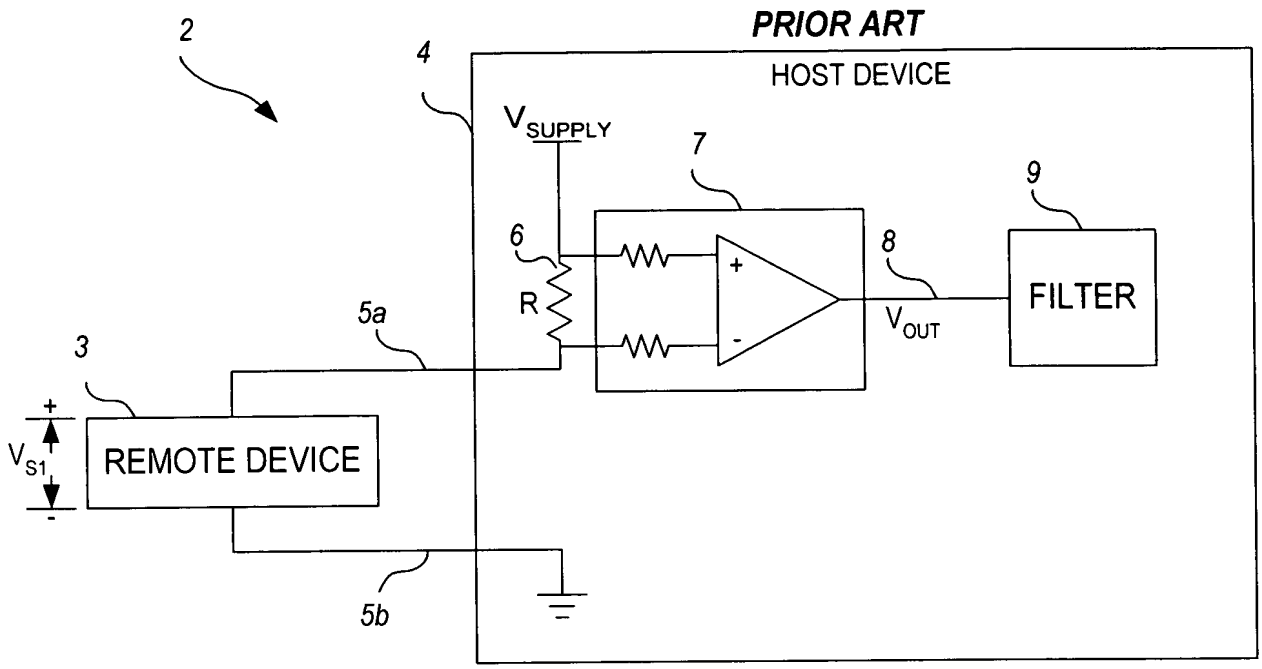

PRIOR ART
2
4
HOST DEVICE
V_{SUPPLY}
7
9
6
8
R
FILTER
V_{OUT}
5a
3
V_{S1}
REMOTE DEVICE
5b

FIG. 1

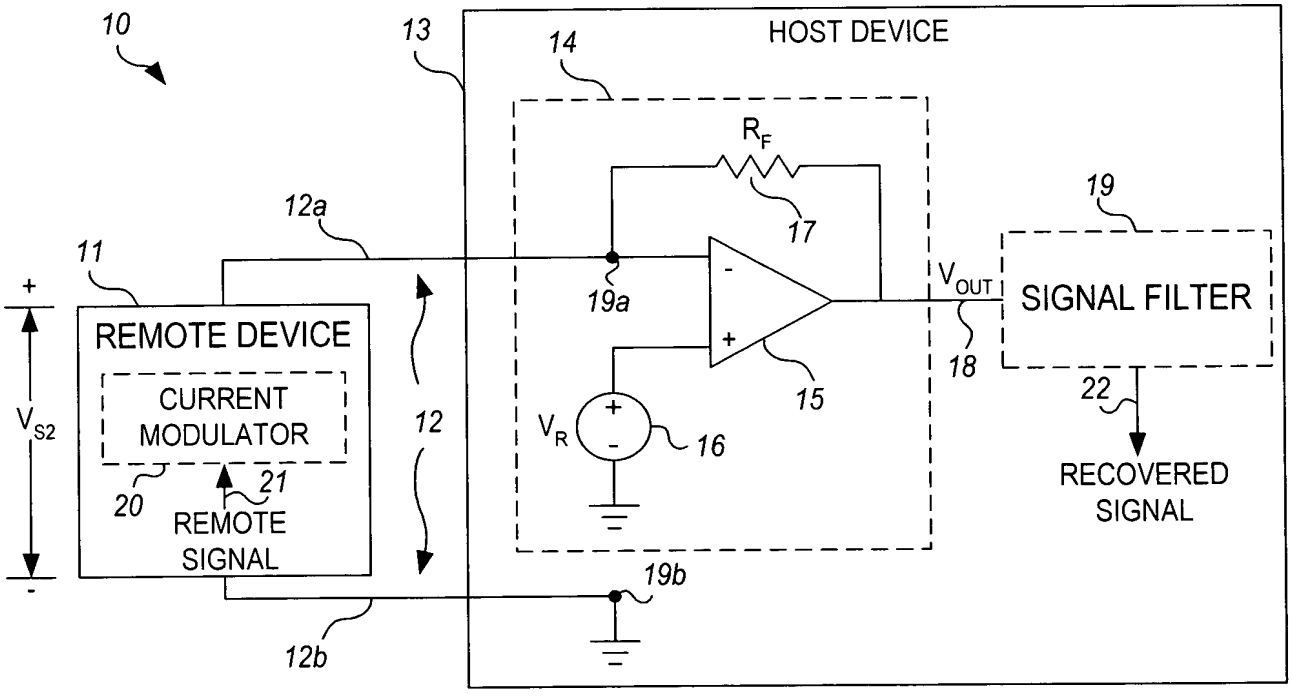

10
13
HOST DEVICE
14
R_F
17
19
12a
11
19a
V_{OUT}
SIGNAL FILTER
REMOTE DEVICE
CURRENT MODULATOR
15
18
22
V_{S2}
12
V_R
16
20
21
REMOTE SIGNAL
RECOVERED SIGNAL
19b
12b

FIG. 2A

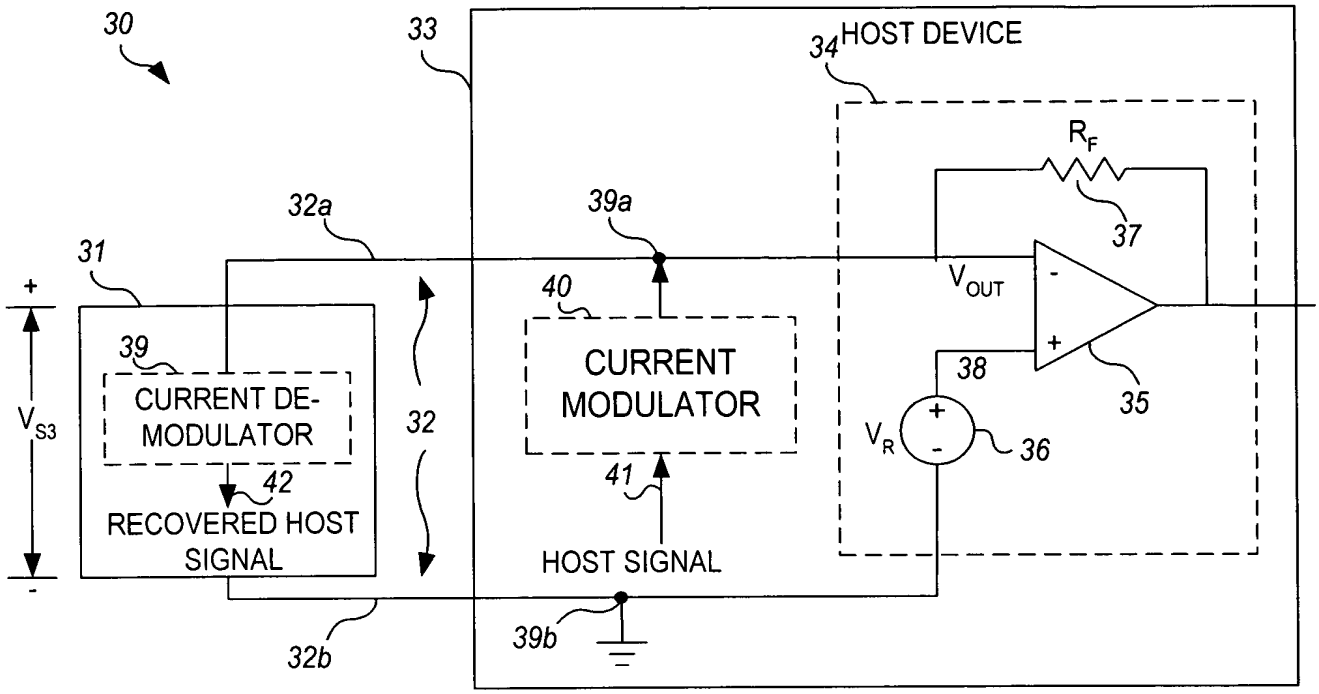


FIG. 2B

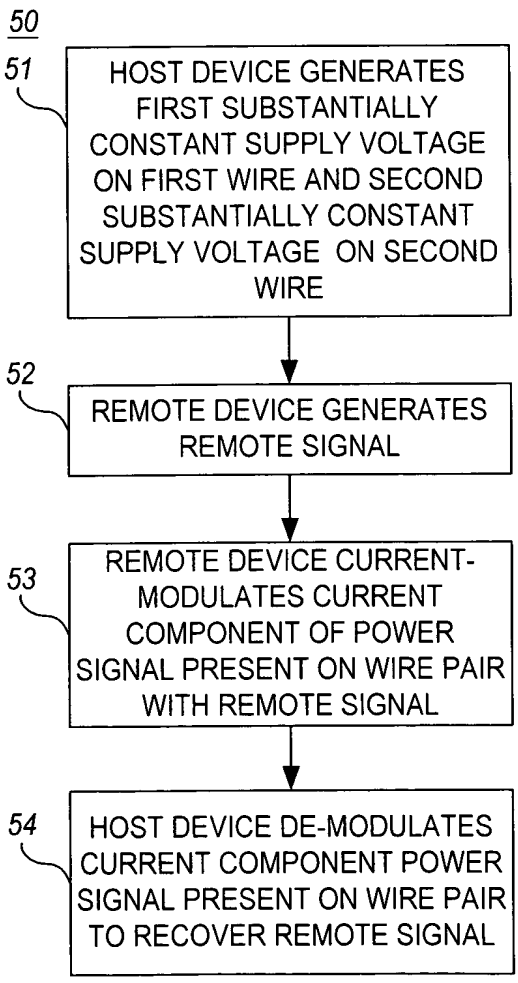


FIG. 3A

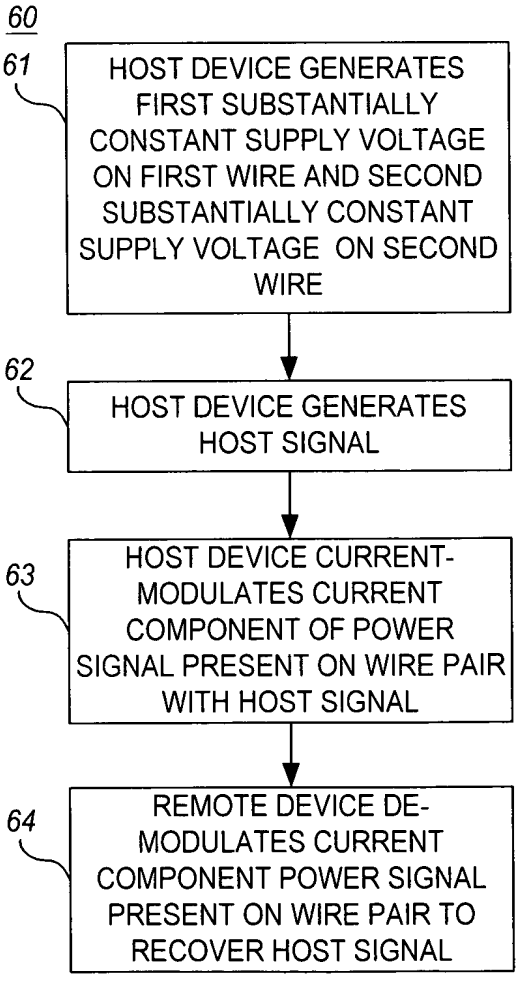


FIG. 3B

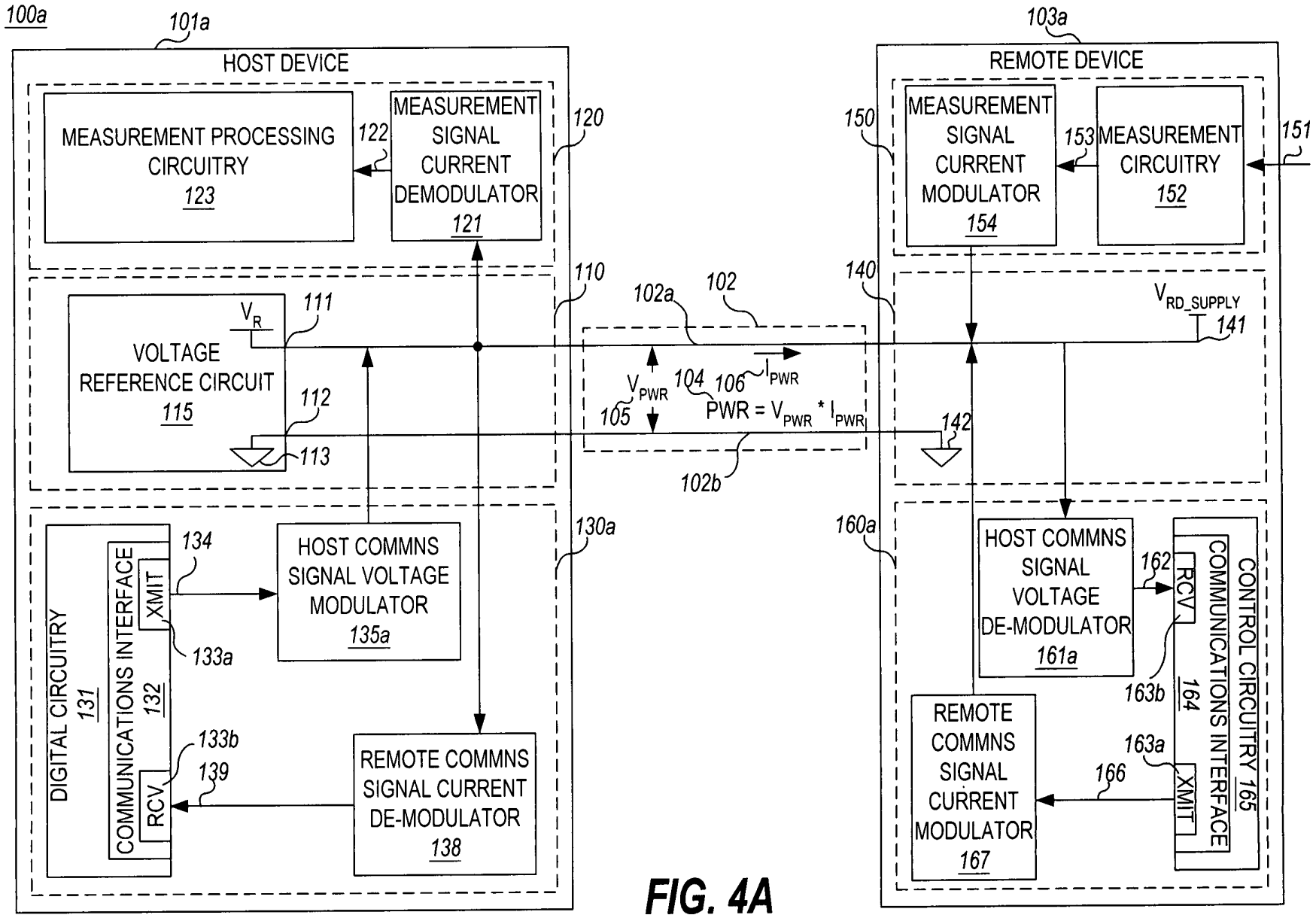

100a
101a
HOST DEVICE
MEASUREMENT PROCESSING CIRCUITRY 123
122
MEASUREMENT SIGNAL CURRENT DEMODULATOR 121
120
110
VOLTAGE REFERENCE CIRCUIT 115
V_R
111
112
113
DIGITAL CIRCUITRY 131
COMMUNICATIONS INTERFACE 132
XMIT
RCV
134
133a
133b
139
HOST COMMNS SIGNAL VOLTAGE MODULATOR 135a
REMOTE COMMNS SIGNAL CURRENT DE-MODULATOR 138
130a
102a
102
102b
V_{PWR}
105
104
106
I_{PWR}
$PWR = V_{PWR} * I_{PWR}$
103a
REMOTE DEVICE
150
MEASUREMENT SIGNAL CURRENT MODULATOR 154
153
MEASUREMENT CIRCUITRY 152
151
140
V_{RD_SUPPLY}
141
142
160a
HOST COMMNS SIGNAL VOLTAGE DE-MODULATOR 161a
162
163b
REMOTE COMMNS SIGNAL CURRENT MODULATOR 167
166
163a
CONTROL CIRCUITRY 165
COMMUNICATIONS INTERFACE 164
RCV
XMIT

FIG. 4A

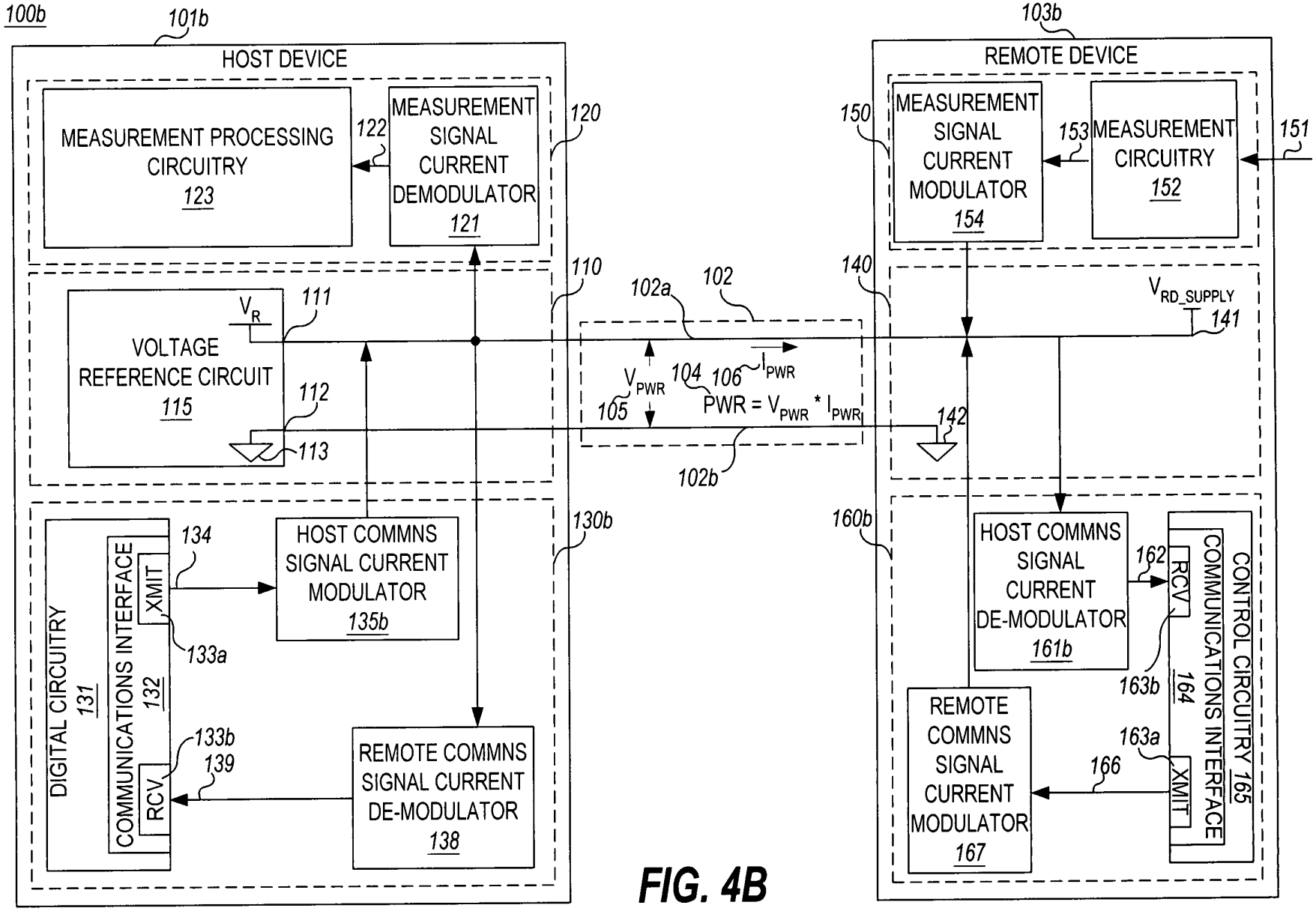
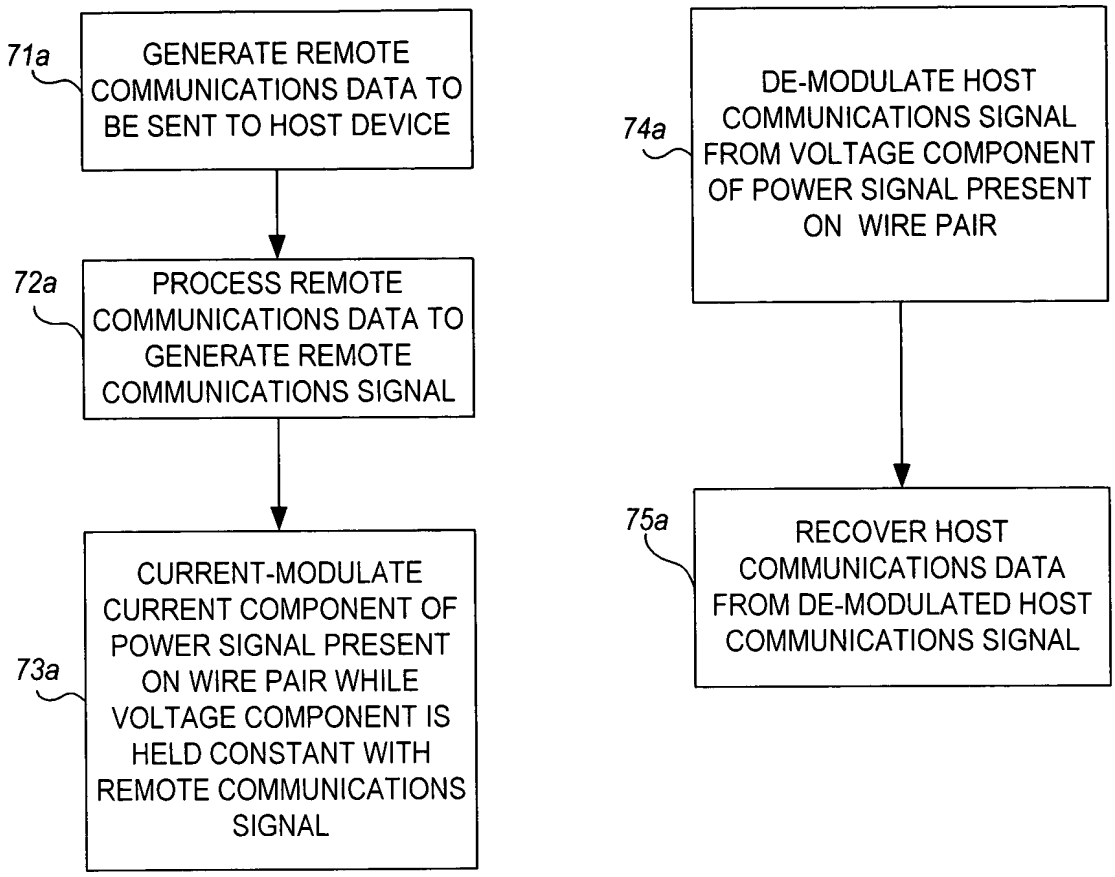

100b
101b
HOST DEVICE
MEASUREMENT PROCESSING CIRCUITRY 123
122
MEASUREMENT SIGNAL CURRENT DEMODULATOR 121
120
110
VOLTAGE REFERENCE CIRCUIT 115
V_R
111
112
113
DIGITAL CIRCUITRY 131
COMMUNICATIONS INTERFACE 132
XMIT
RCV
134
133a
133b
139
HOST COMMNS SIGNAL CURRENT MODULATOR 135b
130b
REMOTE COMMNS SIGNAL CURRENT DE-MODULATOR 138
102a
102
V_{PWR}
104
106
I_{PWR}
105
$PWR = V_{PWR} * I_{PWR}$
102b
103b
REMOTE DEVICE
150
MEASUREMENT SIGNAL CURRENT MODULATOR 154
153
MEASUREMENT CIRCUITRY 152
151
140
V_{RD_SUPPLY}
141
142
160b
HOST COMMNS SIGNAL CURRENT DE-MODULATOR 161b
162
163b
CONTROL CIRCUITRY 165
COMMUNICATIONS INTERFACE 164
RCV
XMIT
163a
166
REMOTE COMMNS SIGNAL CURRENT MODULATOR 167

FIG. 4B

ON REMOTE SENSOR DEVICE:



ON HOST DEVICE:

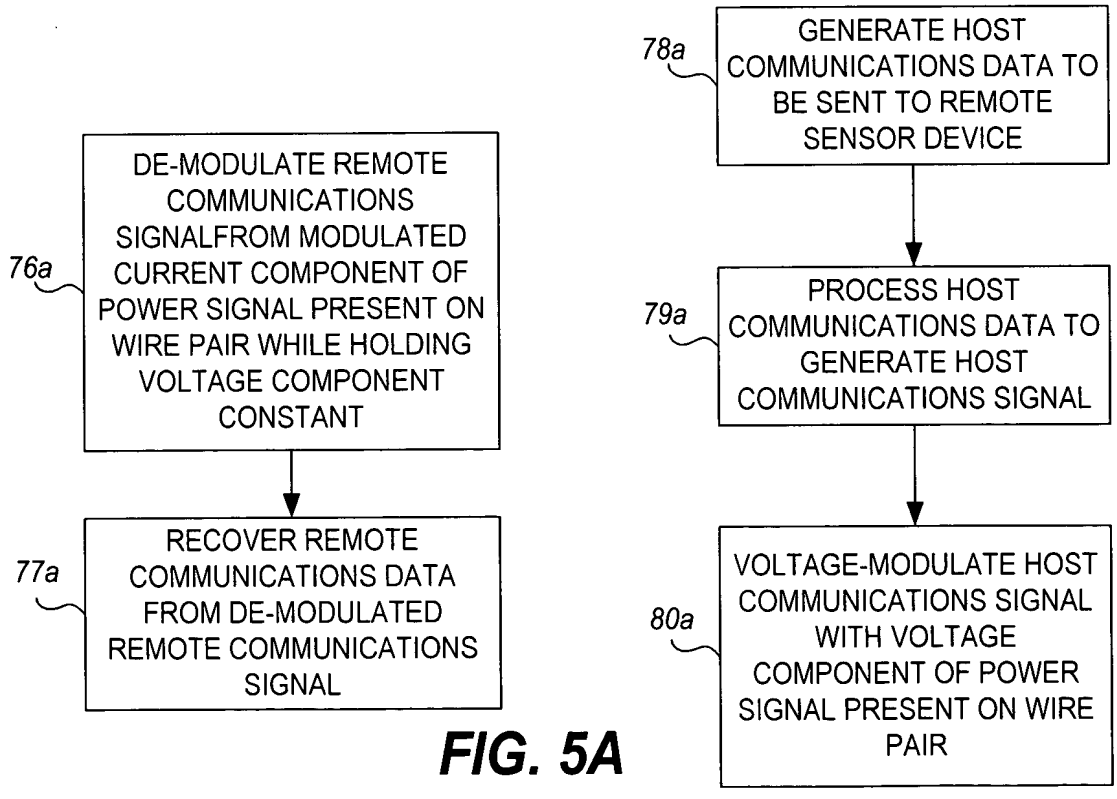
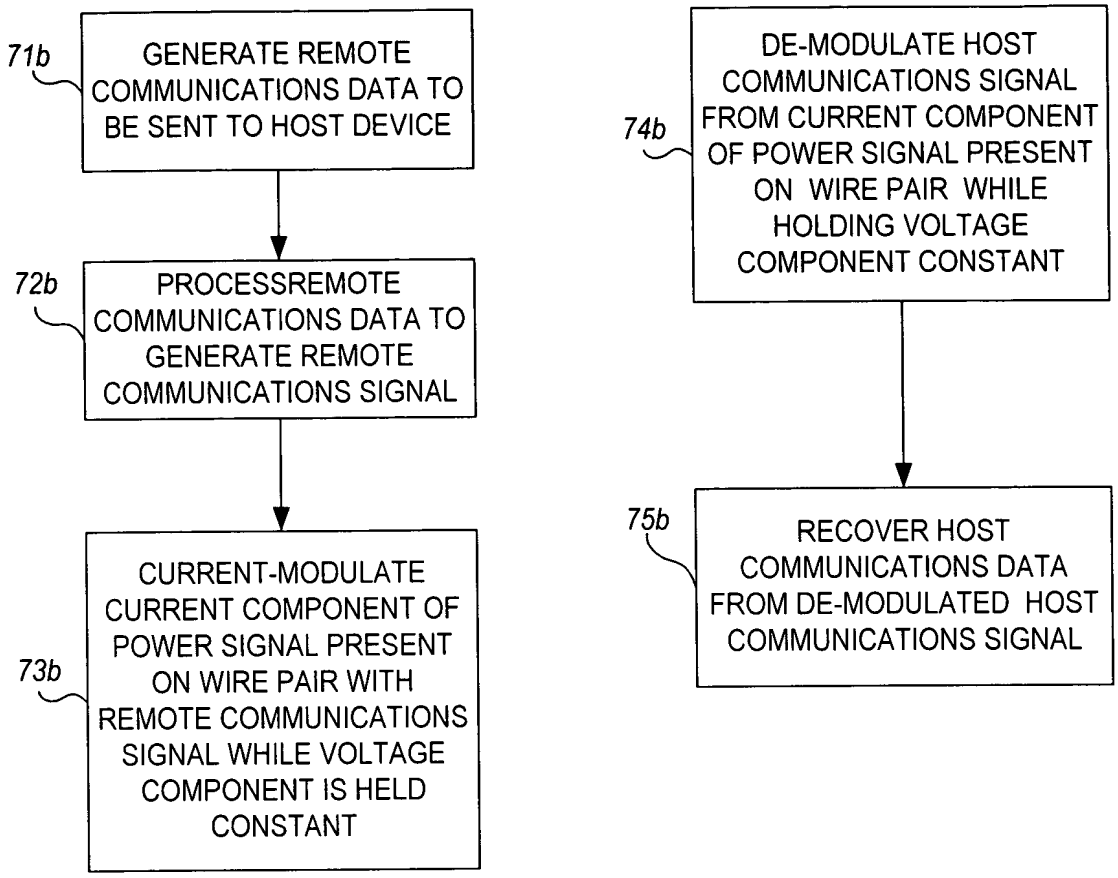


FIG. 5A

ON REMOTE SENSOR DEVICE:



ON HOST DEVICE:

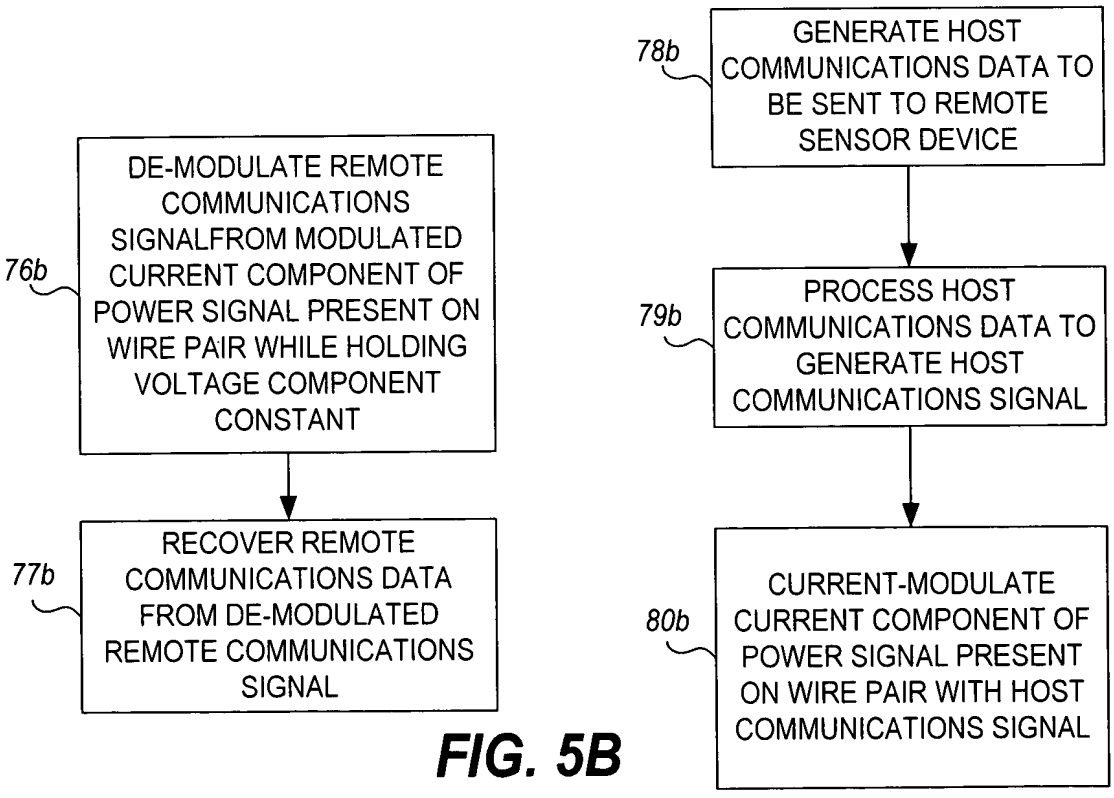


FIG. 5B

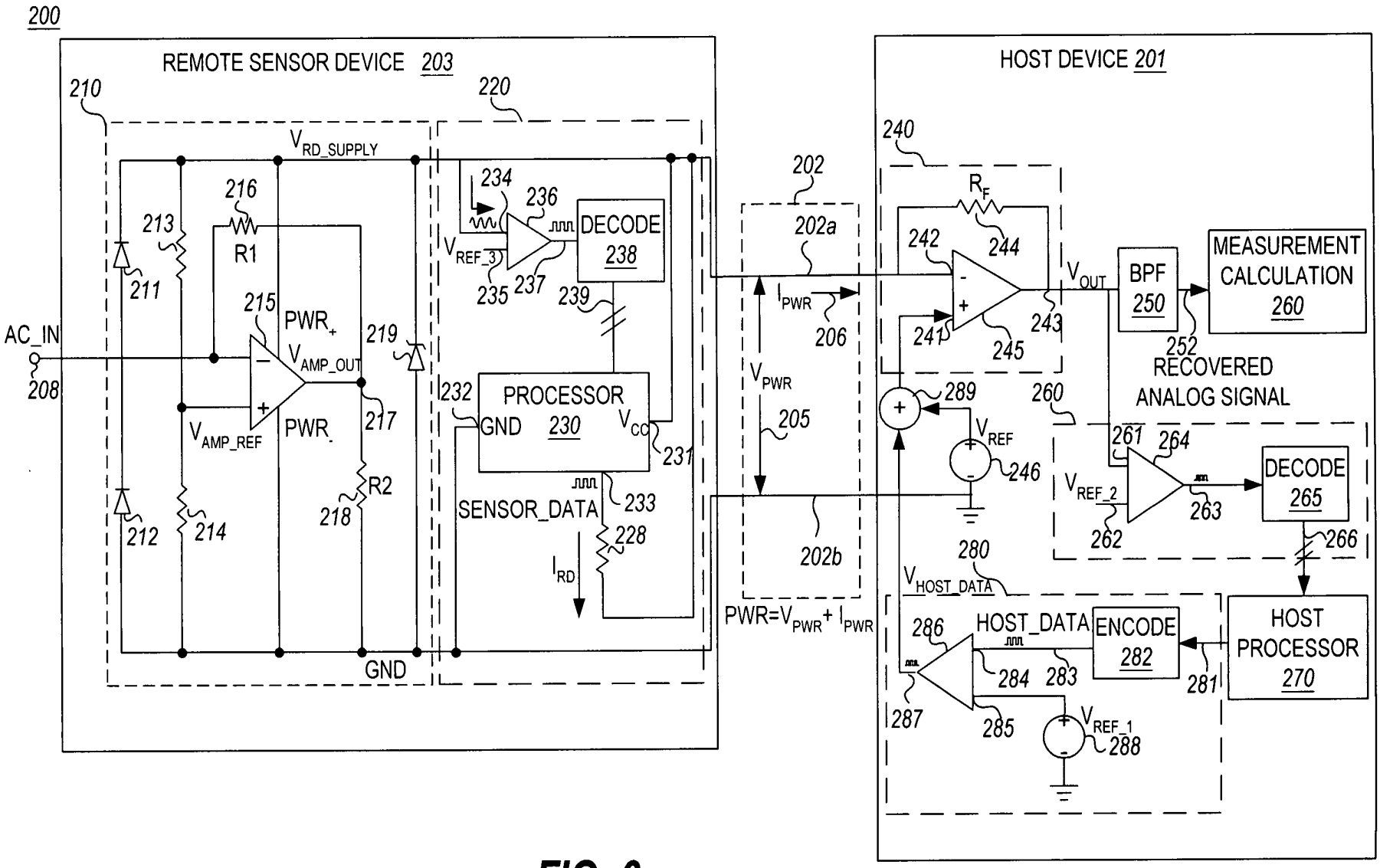

200
REMOTE SENSOR DEVICE 203
HOST DEVICE 201
210
220
240
202
202a
202b
V_{RD_SUPPLY}
216
R1
213
211
215
PWR_+
V_{AMP_OUT}
219
AC_IN
208
V_{AMP_REF}
PWR_-
217
212
214
218
R2
GND
234
236
DECODE
238
V_{REF_3}
235
237
239
232
PROCESSOR
GND 230
V_{CC}
231
SENSOR_DATA
233
228
I_{RD}
I_{PWR}
206
V_{PWR}
205
PWR=V_{PWR}+ I_{PWR}
R_F
242
244
241
245
243
V_{OUT}
BPF
250
252
MEASUREMENT
CALCULATION
260
RECOVERED
ANALOG SIGNAL
289
V_{REF}
246
260
261
264
V_{REF_2}
262
263
DECODE
265
266
280
V_{HOST_DATA}
286
HOST_DATA
ENCODE
282
284
283
281
287
285
V_{REF_1}
288
HOST
PROCESSOR
270

FIG. 6

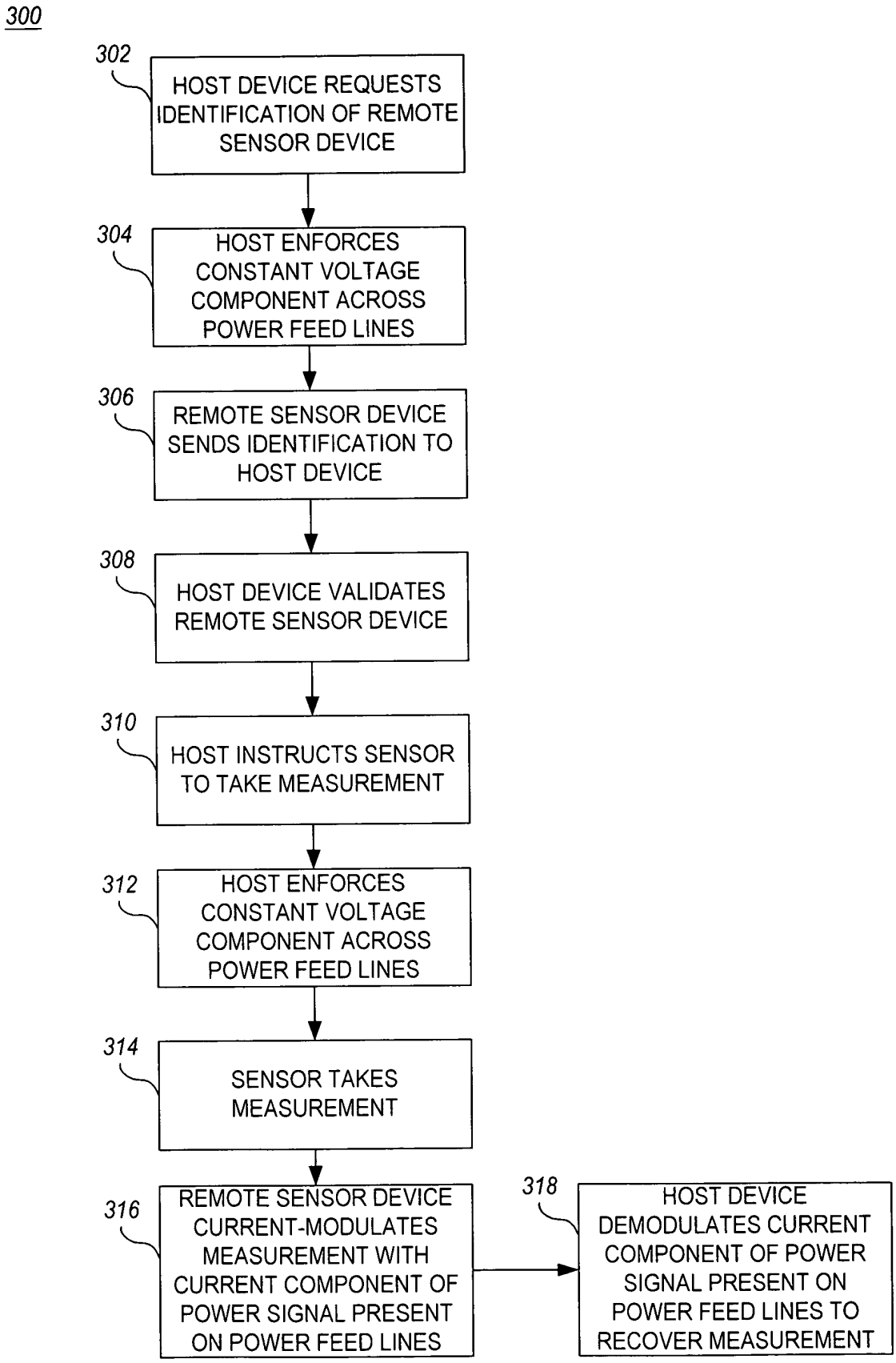

300
302
HOST DEVICE REQUESTS IDENTIFICATION OF REMOTE SENSOR DEVICE
304
HOST ENFORCES CONSTANT VOLTAGE COMPONENT ACROSS POWER FEED LINES
306
REMOTE SENSOR DEVICE SENDS IDENTIFICATION TO HOST DEVICE
308
HOST DEVICE VALIDATES REMOTE SENSOR DEVICE
310
HOST INSTRUCTS SENSOR TO TAKE MEASUREMENT
312
HOST ENFORCES CONSTANT VOLTAGE COMPONENT ACROSS POWER FEED LINES
314
SENSOR TAKES MEASUREMENT
316
REMOTE SENSOR DEVICE CURRENT-MODULATES MEASUREMENT WITH CURRENT COMPONENT OF POWER SIGNAL PRESENT ON POWER FEED LINES
318
HOST DEVICE DEMODULATES CURRENT COMPONENT OF POWER SIGNAL PRESENT ON POWER FEED LINES TO RECOVER MEASUREMENT

FIG. 7